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PRINCIPAL YAMS INTRODUCED AND GROWN IN THE FRENCH WEST INDIES

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INTRODUCTION

Apart from the short publication of STEHLE (1946) and the monograph of GOODING, H.J. (1960), this last more devoted to the Commonwealth Caribbean territories (Trinidad, Tobago, Barbados, St. Vincent, Montserrat and Jamaica), no publication concerns the characteristics of the Yam cultivars grown in the French West Indies. Recently, extensive introductions DEGRAS (1968-1972) have been done at the Plant Breeding Station in Guadeloupe, which widen the range of our varieties to 175 cultivars belonging to seven species: D. alata, D. cavenensis sensu lato, D. trifida, D. nummularia, D. pentaphylla, D. esculenta and D. bulbifera.

The brief descriptions here presented will be refined further in order to give a precise key of cultivars determination. They proceed from up to six years of observations.

Physiological behaviour, morphological traits and cooking aptitude have been taken in account. Apart from those well known in species determination (COURSEY, 1967) some of them are listed here. Of the physiological behaviour the following aspects seem of value: the time of germination, the flowering behaviour, the duration from plantation or germination to flowering (or bulbils formation) to foliar abscission and to tuber maturation. Disease susceptibility is important in some species.

Of the morphological traits the following may be of interest: the type of phyllotaxy and anthocyanic repartition at a definite time and in definite ecological conditions, the occurrence of prickles on stems and roots, the distribution of roots, the cortex and flesh coloration of tubers, the general shape of tubers. As for number and weight of tubers, representing physio-morphological traits they are difficult to ascertain in all conditions though remaining the more agronomically important characteristic. Cooking qualities result from aspect of flesh and taste estimated by local consumers under randomized numbers. They are highly relevant to specific regional habits.

DESCRIPTION OF THE MAIN CULTIVARS

Dioscorea alata L.

"Tahiti" group

Varieties of this group are partly subsontaneous yams which climb up to 15 meters on trees, mostly along forest rivers but generally not too far from cultivated areas. They are vigorous, resistant to anthracnosis, set up bulbils, flower profusely (female type), have large tubers, generally deeply growing but sometime enlarged near the soil surface in a cornlike formation. STEHLE (1946) seems to report this group to D. altissima Lamk. But the common form which has no prickles on the stem does not conform to this species. GOODING (1960) hesitated also for his cultivars "Ginger", "Long Finger" and "Wild Red" and ascribing such types to D. alata. Though this question needs obviously more investigation we maintain this group within D. Alata.

The varieties differ by the relative production of bulbils to underground tuber. A forest-collected clone (TAHITI spontanée) gives up to 15% of the whole harvest in bulbils. We classify on this point: TAHITI spontanée, SASSA (1) TAHITI cultivée, ST. MARTIN (Marin), SASSA (2) in 1969. An oceanian type NOUMEA first cultivated without stake developed one third of its production in bulbils (1971). Its underground tuber is somewhat roundshaped and very hard. Bulbils rooted deeply which growing.

They differ also in the earliness of bulbils formation. In 1967, the following sequence occurred: SASSA (1) in september, both TAHITI forms, TELEMAQUE (1) and (2) in october, ST. VINCENT BLANC (1) in November. Generally bulbils formation started along with flowering.

Flesh of tuber is whitish to yellowish but turns to grey purplish at cooking for some types. Tubers are long stout necked with some fingers in the ST. VINCENT type. They mature lately. The neck is badly edible and is used for plantation.

An intermediate group of cultivars sets up bulbils, flowers easily (always in female type) but is less vigorous, susceptible to anthracnosis, has near surface divided tubers, each part being somewhat rounded. Main forms are CAPLAOU (1), ST. VINCENT BLANC (2), ST. VINCENT BLANC (STE ROSE), STE CATHERINE and ST. VINCENT VIOLET, the two last one having purple or white mixed purplish flesh.

"Pacala" group

These cultivars are the most appreciated among the species for their cooking qualities, dormancy and general presentation. The tubers are more or less without attached roots, have a smooth appearance, more or less regular form. The flesh is white or at least creamy. The type has no flower, nor bulbils, and though diversified, remain without heavy anthocyaned organs.

Six sub-groups can be described:

1. Susceptibility to anthracnosis in the field is very weak, tubers are somewhat digitated or forked, stems and leaves when adult are poorly anthocyaned. BÉTE-BÉTE and Ivorian introduction, differs from V7 A1 (IRAT accession*) by a somewhat longer dormancy, shorter vegetative cycle and less heavy tuber.
2. Susceptibility to anthracnosis remains low, and organs poorly anthocyaned, but tubers are very regular, shortly elongated. V7 A/3 is an early maturing clone of this type with shorter dormancy than PACALA STATION and PACALA COMMUNE, this last one being a little less productive than the other which has a later maturity.
3. Susceptibility to anthracnosis seems higher though not excessive. Anthocyanin is developed, tubers are regular, more rounded, with ASHMORA and BARBADOS received from Trinidad, while SIGUIE from Ivory Coast is more elongated. BARBADOS seems to be less dormant among the sub-group.
4. High level of susceptibility to anthracnosis is observed in the field. Tubers are regularly elongated and scarcely digitated at the distal point. Anthocyanin is rare. Maturity is late. IRAT 72 differs from IRAT 76 by a shorter dormancy.
5. High susceptibility is present, tubers are forked. Dormancy can be longer with AKAZAYA from West Africa than with local PACALA DAME-JEANNE.
6. High susceptibility to anthracnosis in the field, anthocyaned organs, regularly elongated tubers, short dormancy are the traits of V7 1 and PACALA DOMINIQUE, the late having very higher yield even taken in account its somewhat better behaviour regarding anthracnosis.

A number of less typically relevant varieties are to set by these sub-groups: ORIENTAL from Trinidad differs from the third sub-group by its red-purplish cortex and its ability to flower. PYRAMID from Puerto Rico differs by its more round-shaped tuber and its flowers. LUPIAS from Oceania is remarkable with its rare case of male flowerint in our collection. WANHMANA (B) from Oceania, CUELIU LARGO. FLORIDO, SEAL TOD, SMOOTH STATIA received from Puerto Rico (Mayaguez) seem to belong to "Pacala" group.

Other Varieties

A number of other D. alata cultivars cannot be gathered in important groups. Some are highly typified by the shape of their tubers. So are the N' Z A and N'ZIOUA from West Africa with their long and slender neck but smooth bark which give them a ham appearance. So are also the recent Ivorian introductions OUODOUO and OUODOUBLE well described as a coiled snake (see MIEGE, 1952) and with which conforms exactly the West Indian cultivar SERPENT. COULEUVRE is not very far of them.

A large part of the recently introduced cultivars from Oceania and Puerto Rico needs more observations.

Dioscorea trifida L.

The american species is well represented by 43 clones from Guadeloupe, Martinique (INRA and IRAT collection) and French Guyana. This material is expending though hybridization (DEGRAS, 1969, DEGRAS and al. 1971.)

Two main unequal groups must be considered. The first one has flatten horse hoof tubers, as short vegetative cycle (five months), less flowers, shorter leaves. It is the var. Tuberosa of STEHLE (1946). PATTE A CHEVAL and IRAT 58 are belonging to it. The tuber

*) IRAT = Institut de Recherches Agronomiques Tropicales et Vivrieres which transferred in 1966 all its local collection to INRA Research Center in Guadeloupe.

flesh is white. The second one, seemed var Genuina by STEHLE, has club-shaped, tuber more or less elongated, sometimes spheroidal, a longer cycle duration (six to seven months) and diversified flesh coloration.

Flesh coloration goes from white to purplish (COUCHE COUCHE VIOLETTE), red purple (COUCHE COUCHE ROUGE) and deep purple (IRAT 24). May be that anthocyanin intensity appears greater on vegetative organs of white fleshed varieties. Dormancy duration typified some varieties: COUCHE COUCHE VIOLETTE and IRAT 24 remained 35 days dormant while COUCHE COUCHE BELFORT and COUCHE COUCHE LONGE reached 50 days.

Susceptibility to virosis has not been retained in all clones descriptions. But its occurrence can be ascertained. Cooking quality is under observation and results are somewhat conflicting.

Sexuality and cultivar selection

One can refer to the quoted papers about the extension and use of sexuality in our *D. trifida* selection. Several hundreds of seedlings have been selected. No flowering forms were dominant, and among flowering forms, the male dominated. Much has to be gained in the control of pollination. Till now only the mother parentage is sure.

Cycle deseasoning

Deseasoning is needed for continuous marketing, as dormancy is not easily controlled.

Taking advantage of the equatorial cycle adaptations of just introduced cultivars from French Guyana, some were planted in September 1970. They flower from March to July and were harvested in next September (1971). Replanted in October 1971 they are flowering since January 1972.

Meanwhile the local cultivars (normal cycle from February to next January) planted in September 1971 reached maturity in April 1972.

Dioscorea cayenensis Lamk (sensu lato)

Most authors maintain a separation between a *D. rotundata* Poir species with white flesh and a *D. cayenensis* Lamk with yellow flesh. If this grouping were done in our collection, most varieties (18) should belong to *D. rotundata*, the more common local cultivars being of the GROSSE CAILLE group. Six should be clearly ascribed to *D. cayenensis* sensu stricto: A TOUT TEMPS, GUY, IGNAME JAUNE, IGNAME POULE (local cultivars), KANGRA JAUNE, LOPKA (from Ivory Coast). Three cultivars show a colour fluctuation depending from year conditions: V 17/1, SAINT PRIX, GROSSE CAILLE STATION. There is no need to underline the limited value of such a "specific" criteria.

The tubers shape is always elongated but very often ended by some short digitations (A TOUT TEMPS, GUY, COROSSOL, EPINEUSE, GROSSE CAILLE TROIS MOIS, SAINT PRIX) some ended with long digitations (GROSSE CAILLE STATION, IGNAME GUINEE, IGNAME JAUNE, IGNAME POULE, KANGRA JAUNE, PORTUGAISE EPINEUSE, PORTUGAISE TROIS MOIS, V 17/1, V 24/4).

A few are always regularly and simply elongated (KANGRA ALENGRE, LOPKA). Tuber dormancy is generally short, not exceeding two months. IGNAME PIQUANT, GUINEE, GROSSE CAILLE COROSSOL, GROSSE CAILLE TROIS MOIS, GROSSE CAILLE EPINEUSE, PORTUGAISE TROIS MOIS, PORTUGAISE EPINEUSE show no more than 20 to 30 days of dormancy.

Cycle duration from germination to harvest turn around seven months for the latest cultivars (A TOUT TEMPS, GUY, IGNAME PIQUANT, IGNAME POGNON, IGNAME POULE, IRAT 49). The others take often less than five months some years. All the cultivars of this species can be harvested twice or more, depending from the year ecology and plantation time. So the ability to regrow after tuber harvest must be taken in account. GROSSE CAILLE COROSSOL, GROSSE CAILLE STATION, LOPKA, ST. PRIX which are late maturing cultivars give often a higher yield at the second harvest. It is always the last harvest which give the seed pieces.

Flowering is rather common among this species. But female type are always less frequent and no seeds has germinated in our conditions. Flowering starts from one to four months after general germination, depending from varieties, plantation time and year conditions. A very high fluctuation is obvious. Not all varieties which can flower exhibit their flower each year. Over five years of observations we noticed the flowering behaviour:

Number of clones flowering	For this number of years over five years
4	0
3	1
5	2
2	3
8	4
<u>6</u>	5
28	

Dioscorea Esculenta (Lour) Burk

This species is rarely seen in the local fields. It's prickly profuse stems and roots, its taste and very long cycle let it aside of interest for most people.

Only one cultivar (Pas Possible) was known in our islands by the year 1965 when we introduced Blafoué Douo from Ivory Coast. Unfortunately this type is exactly similar.

Five cultivars received from Mayaguez in 1971 bring some new traits. Tubers of Name de Pana are more rounded, tubers of Spindle are more elongated.

Dioscorea Nummularia Lam.

Represented by the unique cultivar WAEL from the Lifou island of Oceania, this species is very similar to *D. Cayensis*. But the stems are not prickly and show and anthocyanic trace all along. Moreover the length of foliage duration last over the months and tubers grow steadily. The tubers are numerous, white fleshed, highly appreciated by our tasters.

Dioscorea pentaphylla L.

Also represented by a unique cultivar from Lifou Island WAHNAOL, this species is very distinct by its 3-5 palmate leaves, its numerous little smooth bulbils and its bowl shaped tubers which have a very short dormancy. The upper part of the tuber is covered with roots. The flesh is yellow, fibrous and not well appreciated by our testers. It flowers in our condition (female type).

Dioscorea bulbifera L.

Three clones of this species are now in our collection ADON is the local cultivar of female type without underground tubers. Its bulbils are often triquetrous. THUMA from Lifou Island is of male type, its inflorescence growing more anthocyaned when opening. It has a very hairy underground tuber.

S U M M A R Y

The *Dioscorea* collection placed at Duclos, Petit-Bourg, Guadeloupe is described. It includes up to date 164 cultivars among which 75 *D. alata*, 51 *D. trifida*, 26 *D. cayensis*, 7 *D. esculenta*, 3 *D. bulbifera*, 1 *D. nummularia*, 1 *D. pentaphylla*. Wild types are collected

In the *D. alata* two groups are remarkable one apperanted to subspontaneous yam "Tahiti" possess bulbils and has a very differentiated proximal tuberization are, the other, most appreciated typified by the cultivar "Pacala" has neither bulbils nor clear tuberisation area. Growth durations are variable.

The *D. cayensis* includes forms of *D. rotundata* and *D. cayensis* s.s. They distingu themselves by the absence or short dormancy and earliness.

The *D. Trifida* are in progress for genetical diversification. The usual cultivars ressources are interesting, notably by their different aptitudes in diseasoning, in conservation, in their sexualisation and root morphology.

D. nummularia proves to be particularly promising for cooking aptitudes.

The small growers of the French West Indies are highly interested in the multiplication of several of these cultivars associated with some improved cultural technics.

LITERATURE CITED

- COURSEY, D. G., 1967, YAMS, Longmans, London
- DEGRAS, L. M., 1969, Root crops research at the Plant Breeding Station of the French West Indies. Trop. Root Crops Newsletter, 2, 15-16.
- DEGRAS, L. M., 1969, Quelques données sur la variabilité de descendance d'Igname Cousse Couche (*D. trifida* L.) VIIth Ann. Meet. CFCG, Fort de France
- DEGRAS, L.M. 1970, Morphology, physiology and selection in three tropical tuber crops, 2nd Inter. Symp. Trop. Root and Tuber Crops. Hawaii p. 163-165
- DEGRAS, L.M., SUARD, C., POITOUT, A., ARNOLIN, R., 1971, Observations on recently introduced Pacific yams in the French West Indies, Trop. Root Crops Newsletter, 4, 44-45.
- DEGRAS, L.M., POITOUT, A., (in press). Edible *Dioscorea* continuous studies at the INRA Station in Guadeloupe, Trop. Root Crops Newsletter.
- GOODING, H. J., 1960, West Indian "*Dioscorea alata*" cultivars, Trop. Agric. 37, 1, p. 12-30.
- MIEGE, J., 1952, L'importance économique des Ignames en Côte d'Ivoire, R.B. A.A.T., 144-155.
- STEHLE, H., 1946, Les Dioscoreacées (Ignames) détermination, culture et intérêt aux Antilles Françaises, Revue Agricole de la Guadeloupe, II, 5, 149-154, 191-198 et III, 32-37.

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BEAN POD AND SEED DAMAGE BY BEAN POD BORER

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SUMMARY

Three varieties each color of black, brown, and white beans (*Phaseolus vulgaris*) were tested to determine the effect of coat color on susceptibility to bean weevil (*Bruchus chinensis*) (Coleoptera Bruchidae) attack.

Pods of all the varieties tested were attacked by the bean-leaf weevil, however, varieties with black seed coat were attacked more frequently than brown or white. Differences between black and brown or white varieties were significant, differences between white and brown varieties were not significant.

The number of infested seeds per pod was higher in black-coated varieties than brown; white-coated varieties suffered the least attack.

The ratio of the number of seeds infested to the total number of seeds per variety was nearly equal in all varieties. The only differences were in pod puncture rate and the number of seeds in each pod.

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SOME ASPECTS ON THE STORAGE CONDITIONS OF THE RED SPANISH PINEAPPLE

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SUMMARY

In order to diminish the shipping hazards, the Puerto Rican pineapple growers are exporting pineapple fruits in a maturity stage called shipping green. This stage of maturity has not reached the proper ripeness and best attributes on the eating quality of the fruit. In order to improve these quality attributes more advanced stages of ripeness are being studied.

Under controlled conditions, of temperature and relative humidity, we have been able to store one-fourth ripe pineapple fruit for 16 days at salable condition, compare to 19 days with the shipping green. The eating quality of this fruit has been found to be similar to the half-ripe and fully ripe fruit.

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